unified COLOR™

HDR Expose 1.0

User Manual

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Getting Started

Unified Color Technologies, LLC offers the only HDR applications that unlock the full range of vibrant colors visible to the human eye by allowing you to create and work with High Dynamic Range (HDR) images. HDR Expose uses Unified Color Technologies' patented Beyond RGB™ color model, which gives you complete control over the colors and brightness in your images and can also merge multiple images to create truly stunning results. Colors and brightness are processed on separate channels, meaning that you can adjust colors without affecting image brightness and vice-versa.

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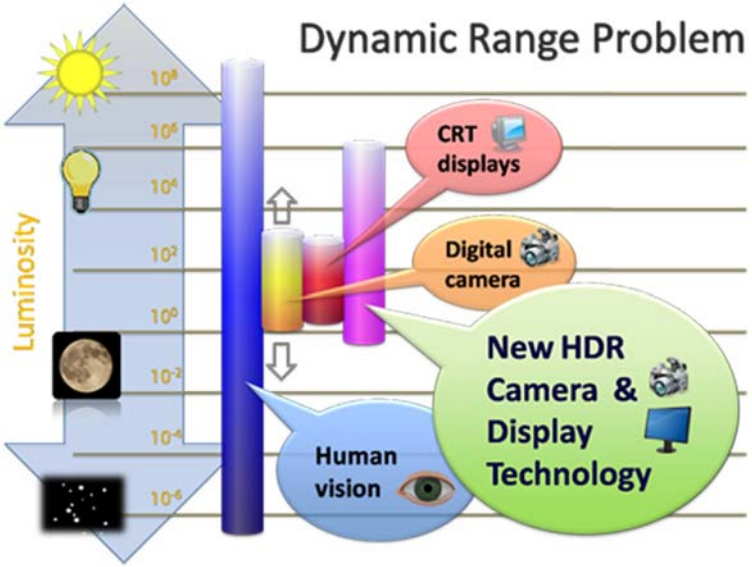
What is HDR?

Nature abounds with colors and contrasts that the human eye and brain are exquisitely adapted to see and appreciate. Unfortunately, the pictures we take of these stunning scenes often appear flat and dull by comparison even when we use high-quality equipment. Why?

The problem is that the range of colors and contrasts available in nature far exceeds the capabilities of conventional CRT-based image capture and display technology. This chart compares the luminosity range of the human eye with that of current display technology. This limit is referred to as the Dynamic Range problem.



As you can see, no current device even comes close to reproducing the range of light and color visible to the human eye. This is why the pictures you take of beautiful landscapes and high-contrast scenes don't always match what you actually saw when you took the picture.

High Dynamic Range (HDR) imaging expands the range of exposures far beyond the limits of conventional Low Dynamic Range (LDR) digital imaging techniques. HDR imaging can accurately represent the wide range of intensity levels found in real scenes ranging from direct sunlight to the deepest shadows.

Traditional display and printing technologies use color models that limit the available gamut of colors to accommodate current display technology. HDR Expose uses the full spectrum of color visible to the human eye at all times without imposing any artificial limits. Your current display or printer may not be able to show the full gamut of colors that HDR Expose works with… but working with HDR Expose ensures that your images will keep looking better and better as display and printer technologies improve.

HDR Expose delivers extreme precision thanks to its 32-bit floating point High Dynamic Range technology that is built into the entire workflow. This technology offers a dynamic range of 10^{76}:1, which is enough to address any real-world lighting conditions.

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Program Features & Benefits

Designed around Nature: HDR Expose is the only image-editing application that offers the Beyond RGB color model based on full human vision (rather than a particular display device).

Full Color Integrity: HDR Expose has none of the typical color shift problems commonly found in traditional imaging tools because the brightness (brightness, contrast, shadow/highlight, sharpness, etc.) and color (white balance, saturation, color tuning, etc.) channels are separate. This means that brightness changes will not change your color tones, and vice-versa.

High-Precision HDR Editing: HDR Expose offers full-featured 32-bit floating point image editing that gives you full fidelity without having to down sample your image to 8- or 16-bits. This amazing level of precision is delivered through powerful, easy to use tools.

Industry Leading HDR Compression: Save disk space and bandwidth using the highest level of data compression available. HDR Expose saves JPEG-sized files with no loss of color or brightness data.

Advanced HDR Rendering: Work on a single HDR image, or merge multiple images together to create an HDR image. HDR Expose takes advanced HDR rendering to the next level.

255 Undo Levels with Visual History: See your most recent 255 editing actions as you work. Undo or adjust any step. Create recipes from your stored editing history (even across multiple editing sessions) when you save images in the HDR Expose BEF file format.

Adobe® Photoshop® Support: The available BEF file format plug-in for Photoshop lets you open, edit and save BEF files in Photoshop.

Noise Elimination: The patented noise-reduction tools included in HDR Expose reduce brightness and color noise while preserving more of the fine image details that are often lost when using other image applications.

Powerful Tools: HDR Expose includes a full suite of powerful editing functions such as **Veiling Glare** (which reduces haze caused by stray light reflecting between camera lens surfaces), **White Balance**, **Color Tuning**, **Tint** (toning), **Local Contrast**, **Shadow/Highlight** with halo reduction, and many more.

Convenient Features: HDR Expose includes many features designed to make your workflow faster and more efficient. You may preview thumbnails for most image formats (including RAW). Batch processing lets you apply a recipe to multiple images. Dragging and dropping multiple images into HDR Expose automatically launches the Merge function. Get an unobstructed view of your work in full-screen mode, using easy mouse shortcuts to access all program functions and tools.

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Program Features & Benefits (continued)

Optimized for High Performance: HDR Expose supports multi-core CPUs. Application performance scales almost linearly based on the number of available CPU cores. For example, a quad-core CPU system quadruples performance compared to a single-core system, and so forth.

Native 64-bit Support: Using the latest 64-bit computing architecture gives you higher performance and removes the legacy memory limitations of 32-bit systems. HDR Expose includes native x64 platform support for either Intel® or AMD® processors.

BEF File Format: The native HDR Expose BEF file format offers a lossless way to save HDR images using extremely efficient compression that saves both disk space and bandwidth. BEF files save visual data using the full color range of human vision. Tying file data to human vision and not a particular display device lets you store images in a form suitable for any display hardware, even displays that have not yet been invented. Saving an image in BEF format means that your pictures will keep looking better and better as display technology improves. You can even specify quality settings that define the degree to which colors may visually deviate from their original values, which gives you maximum control over file size vs. quality.

Operation History: Normally, exiting and restarting an application loses your history, even if you saved your file just before exiting the application. HDR Expose saves your complete operation history when you save images in the BEF format. This exclusive feature means that you can reopen a previously saved file and see what you've done before. You can also use this information to create a recipe for future use.

Future-proof: HDR Expose always lets you work with the full color range available to the human eye, even if you cannot see all of these colors on your monitor. Many cameras typically do capture full color range data; however, selecting an image option such as JPG clips the color data. Saving your images in a RAW format and merging them into an HDR Expose BEF file preserves the data, which will become visible as display and printing technology improves. With HDR Expose, you never have to worry about re-taking images or not being able to preserve the full richness of your images.

Supported File Formats: HDR Expose supports the following image file formats:

- Input:
  - BEF (HDR Expose native file format)
  - Radiance HDR (.hdr, .pic)
  - OpenEXR (.exr)
  - Camera RAW formats (.cr2, .nef, .raw, etc. For a full list of supported RAW file types, please visit www.unifiedcolor.com.)
  - 8-, 16-, and 32-bit TIFF (.tif, .tiff)
  - JPEG (.jpg, .jpeg)
  - Bitmap (.bmp)

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Program Features & Benefits (continued)

- Output:
  - BEF
  - OpenEXR (.exr). All OpenEXR compression options are supported.
  - 8-, 16-, and 32-bit TIFF (.tif, .tiff)
  - JPEG (.jpg, .jpeg)
  - Bitmap (.bmp)

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Interface Features

HDR Expose uses a powerful, intuitive interface that includes the following features:

- Full-screen mode.
- Fast mouse scrolling and zooming (from 5% to 800%).
- Dockable **Operations** panel.
- Image **Metadata** display.
- **Brightness Histogram** that shows you the brightness channel histogram in the image and how much of your image is visible using your current monitor.
- Tabbed interface to let you switch between loaded images.
- Interactive history with undo/redo functionality.
- **Status Bar** that displays:
  - **Color Profile** selection button.
  - **Display Brightness** controls.
  - Help and status messages.
  - Zoom controls.
- Preset selection controls in tool windows.
- Eyedropper tools to make brightness/color selections faster when using the **Veiling Glare**, **Brightness/Contrast**, **Shadow/Highlight**, **White Balance**, and **Color Tuning** tools.
- User-definable one-click **Recipe** button.
- Free-angle image rotation.

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System Requirements

To use HDR Expose, your system must conform to the following minimum requirements:

- **Operating System (PC):** Microsoft® Windows® XP, Vista, or Windows 7.
- **Operating System (Mac):** MacOS® X Leopard (10.5.x) or MacOS X Snow Leopard (10.6.x)
- **Processor:** Dual-core 2.0GHz or faster minimum. Quad-core 2.8GHz or faster recommended.
- **RAM:** 2GB minimum (4GB recommended).
- **Video card:** 128MB or higher.

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Getting Help

Technical Support Options

The following technical support options are available in addition to this user manual:

- **Video tutorials:** See HDR Expose in action by watching the videos available at http://unifiedcolor.com/tutorials.
- **Frequently Asked Questions:** If you have a question, chances are that you are not alone. Visit the online FAQ at http://unifiedcolor.com/faq.
- **Technical Support:** If the above resources don't answer your question, please visit the Unified Color Technical page at http://www.unifiedcolor.com/support.

About this Manual

This manual uses several formatting conventions to present information of special importance.

Lists of items, points to consider, or procedures that do not need to be performed in a specific order appear in bullet format:

- Item 1
- Item 2

Procedures that must be followed in a specific order appear in numbered steps:

1. Perform this step first.
2. Perform this step second.

Specific keyboard keys are depicted in square brackets and are capitalized, for example: [ESC]. If more than one key should be pressed simultaneously, the notation will appear as [KEY1]+[KEY 2], for example [ALT]+[F4].

Interface elements such as document titles, fields, windows, tabs, buttons, commands, options, and icons appear in **bold** text.

Menus and submenus have the notation **Menu>Submenu**. For example, "Select **File>Merge to HDR**" means that you should first select **File** in the **Menu Bar**, and then select **Merge to HDR** in the **File** menu.

Note: This manual includes keyboard shortcuts for both PC and Mac users. For Mac users, the ⌘ symbol signifies the [COMMAND] key and the ⌥ symbol signifies the [OPTION] key.

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Installation

PC

To install HDR Expose on a PC:

1. Download the HDR Expose setup application to your disk, following the on-screen instructions. The downloaded file will be **HDRExposeSetup_x86.exe** (for 32-bit systems) or **HDRExposeSetup_x64.exe** (for 64-bit system).)
2. Launch the HDR Expose setup application. If you see a security warning window, click **Run** to proceed with the installation.
3. The **Welcome** window appears. Click **Next** to proceed.
4. The **License Agreement** window appears. Review the license carefully. If you agree to the terms, check the **I accept the terms of the License Agreement** radio button, and then click **Next** to proceed.
5. The **Choose Components** window appears. You should accept the default installation options unless you are an advanced user. Select your desired options by checking the appropriate checkboxes, and then click **Next** to proceed.
6. You will see a progress bar and detailed installation progress information while HDR Expose installs to your system. When the installation is complete, click **Next** to proceed.
7. The **Installation Complete** window appears. You may launch HDR Expose and/or review the Readme file, which contains recent information that may not be included in this manual.

Your installation is now complete. Enjoy!

Mac

To install HDR Expose on a Mac:

1. Double-click the HDR Expose install package icon.
2. Follow the on-screen instructions. These will be similar to the PC instructions listed above.

Your installation is now complete. Enjoy!

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Navigating HDR Expose

This chapter walks you through the HDR Expose interface. HDR Expose offers you several ways to access most functions, which lets you work with images on your terms and focus on getting the results you want instead of figuring out how to use the program.

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Menu Bar

The **Menu Bar** appears at the top edge of the HDR Expose screen.

File Menu

The **File** menu lets you work with and manage your image files. This menu has the following options:

- **Open:** Selecting **File>Open** lets you open a single image in HDR Expose. You may also press [CTRL]+[O] (PC) or [⌘]+[O] (Mac).
- **Save:** Selecting **File>Save** saves the current image. A dialog box appears asking you to specify your desired quality settings. When saving to the BEF format, the quality setting is based on human visual acuity. A **Quality** setting of 1 means that the difference between the original and saved pixels will not exceed the eye's ability to spot that difference. Values above 1 are detectable by the human eye, and values below 1 are below the visually detectable threshold. You may also press [CTRL]+[S] (PC) or [⌘]+[S] (Mac).
- **Save As:** Selecting **File>Save As** lets you save the current image under a new filename and/or folder. You may also press [CTRL]+[SHIFT]+[S] (PC) or [⌘]+[SHIFT]+[S] (Mac).
- **Close:** Selecting **File>Close** closes the current image without exiting HDR Expose. You are prompted to save any unsaved changes. You may also press [CTRL]+[W]. (PC) or [⌘]+[W] (Mac).
- **Merge to HDR:** Selecting **File>Merge to HDR** opens the **Merge to HDR** window, which lets you merge multiple images into a single HDR image. Please see "Creating/Merging HDR Images" on page 34 for more about merging images. You may also press [CTRL]+[H] (PC) or [⌘]+[H] (Mac).
- **Batch Processing:** Selecting **File>Batch Processing** lets you apply a recipe to multiple images. Please see "Batch Processing" on page 38 for more about batch processing. You may also press [CTRL]+[B] (PC) or [⌘]+[B] (Mac).
- **Recent Files:** The **File** menu displays your 10 most recently opened images for quick access. Click the desired image to open it.
- **Exit:** Selecting **File>Exit** (PC) or **File>Quit** (Mac) exits HDR Expose. You are prompted to save any unsaved changes. You may also press [ALT]+[F4] (PC) or [⌘]+[Q] (Mac).

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Edit Menu

The **Edit** menu lets you perform basic image editing functions and manage presets. This menu has the following options:

- **Copy:** Selecting **Edit>Copy** copies the current image to the Windows or MacOS Clipboard. You may also press [CTRL]+[C] (PC) or [⌘]+[C] (Mac).
- **Paste:** Selecting **Edit>Paste** pastes the Windows or MacOS Clipboard contents into the current image. You may also press [CTRL]+[V] (PC) or [⌘]+[P] (Mac)].
- **Preferences:** Selecting **Edit>Preferences** opens the **Preferences** window, which lets you manage how you work with HDR Expose. Please see "Preferences Window" on page 27 for more about the **Preferences** window. You may also press [CTRL]+[,] (PC) or [⌘]+[,] (Mac).

View Menu

The **View** menu lets you customize the HDR Expose interface and zoom in and out of the image you are currently working on. This menu has the following options:

- **Show HDR Image Tools:** Selecting **View>Show HDR Image Tools** toggles the **HDR Image Tools** panel on and off. Please see "HDR Image Tools Panel" on page 15 for more about the **HDR Image Tools** panel. You may also press [TAB] (PC or Mac).
- **Status Bar:** Selecting **View>Status Bar** lets you control the **Status Bar** appearance as follows:
  - **Show Status Bar:** Selecting **View>Status Bar>Show Status Bar** toggles the **Status Bar** on and off.
  - **Zoom Slider:** Selecting **View>Status Bar>Zoom Slider** toggles the **Display Zoom** controls in the **Status Bar** on and off.
  - **Display Brightness Slider:** Selecting **View>Status Bar>Display Brightness Slider** toggles the **Display Brightness** slider in the **Status Bar** on and off.

  Please see "Status Bar" on page 19 for more information about the **Status Bar**.
- **Zoom In:** Selecting **View>Zoom In** zooms in closer to your image. You may also press [CTRL]+[=] (PC) or [⌘]+[=] (Mac).
- **Zoom Out:** Selecting **View>Zoom Out** zooms out farther from your image. You may also press [CTRL]+[-] (PC) or [⌘]+[-] (Mac).
- **Zoom to Fit:** Selecting **View>Zoom to Fit** zooms in or out until your entire image fits within the HDR Expose window. You may also press [Z] (PC or Mac).
- **Actual Pixels:** Selecting **View>Actual Pixels** zooms the image to actual size.

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Menu Bar (continued)

- **Show Brightness Histogram:** Selecting **View>Show Brightness Histogram** toggles the **Brightness Histogram** in the **HDR Image Tools** panel on and off. Please see "Brightness Histogram" on page 15 for more about the **Brightness Histogram**.
- **Show Metadata:** Selecting **View>Show Brightness Histogram** toggles the **Metadata** display in the **HDR Image Tools** panel on and off. Please see "Metadata" on page 16 for more about image metadata.
- **Show Shadow Border:** Selecting V**iew>Show Shadow Border** toggles a dark shadowed border around the edges of opened images on and off.
- **Fullscreen Mode:** Selecting **View>Fullscreen** toggles Fullscreen mode on and off. You may also press [F] (PC or Mac).

Help Menu

The **Help** menu lets you get help with using HDR Expose. This menu has the following options:

- **Help:** Selecting **Help>Help** opens this manual in Adobe® Acrobat® format (PDF). You may also press [F1] (PC or Mac).
- **Visit Homepage:** Selecting **Help>Visit Homepage** launches your default web browser and takes you to the **HDR Expose Features** page.
- **Provide feedback:** Selecting **Help>Provide feedback** launches your default browser and takes you the **HDR Expose Feedback** page, which lets you submit feedback about your experience with the application.
- **Check for updates:** Selecting **Help>Check for updates** connects HDR Expose to the Unified Color, Inc. update server and notifies you if an update is available.
- **About HDR Expose:** Selecting **Help>About HDR Expose** opens the **About HDR Expose** window, which displays program information and provides access to the License Agreement.

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HDR Image Tools Panel

The **HDR Image Tools** panel appears on the right side of the HDR Expose screen. This panel contains the following operational areas:

- **Brightness Histogram (1):** The **Brightness Histogram** displays image brightness information.
- **Metadata (2):** The **Metadata** section displays information about the current image.
- **Operations (3):** The **Operations** section contains the HDR Expose image tools that let you edit your image.
- **History (4):** The **History** section contains a history of your recent actions and is how you undo/recalculate functions and create recipes.
- **Common Controls (5):** Contains controls common to all HDR Expose tools.

Note: The history shown in the image is for reference only; the actual history you see will depend on the actions you take while editing the current image.

Dock/Undock

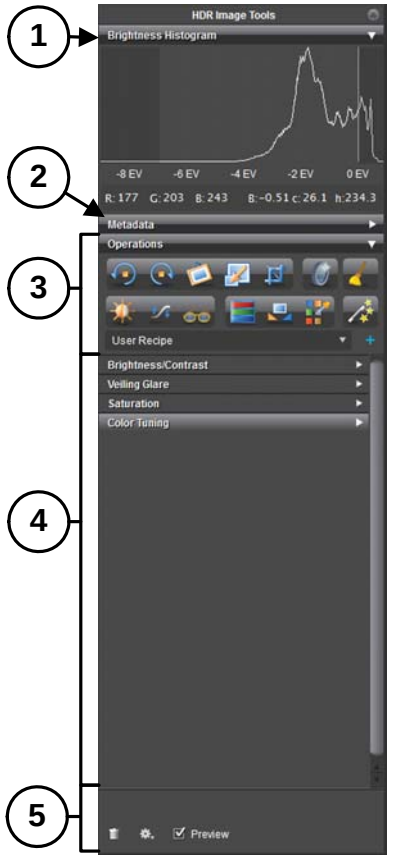
You can dock and undock the HDR Image Tools panel as follows:

- To undock the panel, click and drag the top edge. You can place the panel anywhere on the screen, including on a separate monitor (if your system has multiple monitors).
- To dock the panel, click and drag the top edge to the upper left or upper right side of the HDR Expose window. A colored box appears when the panel is in a dockable position.

Brightness Histogram

The **Brightness Histogram** displays the image brightness channel in EV units (f-stops). The highlighted range (monitor Zone) shows you the brightness range visible under normal conditions. The Monitor Zone moves as you adjust the display brightness.

The 0EV point indicates the point of maximum brightness that the monitor can display. When the display brightness is set to 0, values below 0EV indicate the brightness levels in your monitor's range down to -8EV. Values above 0EV indicate values beyond the ability of your monitor to display (overly bright pixels). Values below -8EV are too dark to appear on your monitor.



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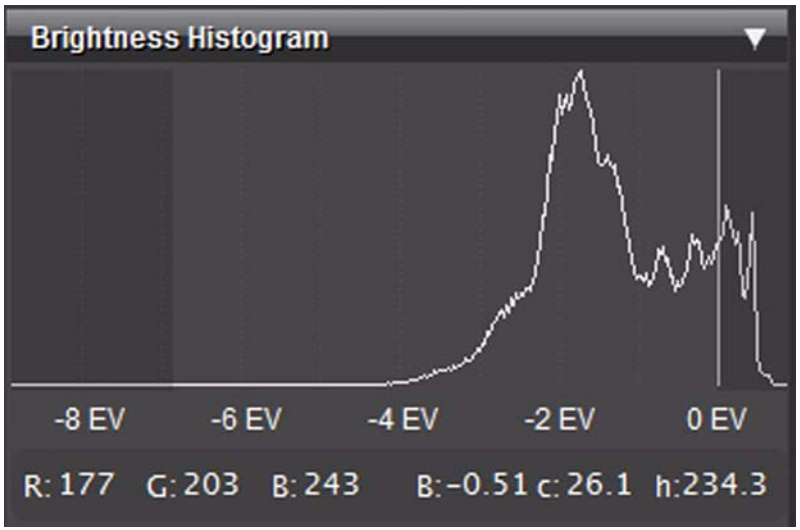
HDR Image Tools Panel (continued)



The **Brightness Histogram** also displays the following information for the current pixel (the pixel under the cursor):

- **R:** Red channel. This value can be displayed in either 8-bit digital counts (0-255) or in percentage (0-100%).
- **G:** Green channel. This value can be displayed in either 8-bit digital counts (0-255) or in percentage (0-100%).
- **B:** Blue channel. This value can be displayed in either 8-bit digital counts (0-255) or in percentage (0-100%).
- **B:** Brightness. This value is displayed in EV and corresponds with the brightness numbers in the HDR Expose application.
- **c:** Chroma. This value display's the currently selected pixel's color saturation from 0 to 100%, where 0% is a neutral point (white or gray D65 point, the standard monitor white point), and 100% is a fully saturated color (the edge of the humanly visible color range).
- **h:** Hue. This value is measured in degrees (0-360°). 0° is red, 120° is green, 240° is blue, and values between are mixtures. For example, 60° is yellow, 180° is aqua, and 270° is purple, etc.

Metadata

The **Metadata** section of the HDR **Image Tools** panel displays information about the current image. Depending on the information that was saved with the image, metadata may include some or all of the following plus any additional information that may be present:

- **Profile:** Color profile name.
- **Type:** Color profile type.
- **Compression:** Compression method used to save the image.
- **Copyright:** Image ownership information.
- **Date/Time:** When the image was taken.
- **Height:** Image height in pixels.
- **Make:** Camera make.
- **Model:** Camera model.
- **Interpretation:** How color is interpreted in the image (such as RGB).

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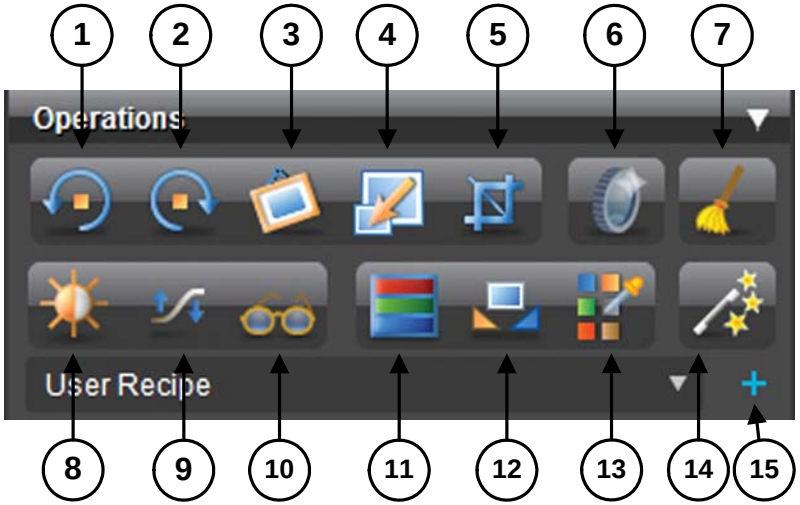
HDR Image Tools Panel (continued)

- **Resolution Unit:** Unit used to measure the image resolution (such as inches).
- **Width:** Image width in pixels.
- **X Resolution:** Image resolution in dots per unit, in the X direction.
- **Y Resolution:** Image resolution in dots per unit in the Y direction.
- **History:** Editing history, if available.

Operations

The **Operations** section of the **HDR Image Tools** panel contains the HDR Expose image editing tools.



The available tools are:

- **Rotate CCW (1):** The **Rotate CCW** tool rotates the image by 90 degrees counterclockwise (left). Please see "Rotate" on page 41 for more about rotating images.
- **Rotate CW (2):** The **Rotate CW** tool rotates the image by 90 degrees clockwise (right). Please see "Rotate" on page 41 for more about rotating images.
- **Free Rotate (3):** The **Free Rotate** tool lets you rotate the image around your desired horizon line. Please see "Rotate" on page 41 for more about rotating images.
- **Resize (4):** The **Resize** tool lets you enlarge or shrink the image. Please see "Resize" on page 42 for more about resizing images.
- **Crop (5):** The **Crop** tool lets you crop your image. Please see "Crop" on page 43 for more about cropping images.
- **Veiling Glare (6):** The **Veiling Glare** tool helps reduce haze in the image. Please see "Veiling Glare" on page 45 for more about the **Veiling Glare** tool.
- **Noise Elimination (7):** The **Noise Elimination** tool lets you reduce color noise in your image. Please see "Noise Elimination" on page 47 for more about the **Noise Elimination** tool.
- **Brightness/Contrast (8):** The **Brightness/Contrast** tool lets you adjust image and local brightness and contrast. Please see "Brightness/Contrast" on page 49 for more about the **Brightness/Contrast** tool.

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HDR Image Tools Panel (continued)

- **Shadow/Highlight (9):** The **Shadow/Highlight** tool lets you control image shadows and highlights. Please see "Shadow/Highlight" on page 51 for more about the **Shadow/Highlight** tool.
- **Sharpness (10):** The **Sharpness** tool lets you adjust image clarity. Please see "Sharpness" on page 53 for more about the **Sharpness** tool.
- **Saturation (11):** The **Saturation** tool lets you control the amount of color in your image. Please see "Saturation" on page 54 for more about the **Saturation** tool.
- **White Balance (12):** The **White Balance** tool lets you correct image lighting. Please see "White Balance" on page 55 for more about the **White Balance** tool.
- **Color Tuning (13):** The **Color Tuning** tool lets you apply powerful color correction options to your image. Please see "Color Tuning" on page 57 for more about the **Color Tuning** tool.
- **Dynamic Range Mapping (14):** The **Dynamic Range Mapping** tool is a quick way to map the current image's dynamic range to the range of your monitor. Please see "Dynamic Range Mapping" on page 59 for more about the **Dynamic Range Mapping** tool.
- **Recipe Add/Select Tools (15):** These tools allow you to create a new recipe or apply an existing recipe to the current image. Please see "Recipes" on page 61 for more information about recipes.

History

The **History** section of the **HDR Image Tools** panel records a history of your most recent 255 operations. Please see "History" on page 40 for more information about working with image history.

Note: Unsaved actions are not preserved after the image is closed or if you save the image to any format other than BEF. You can only undo actions taken during the current session. Actions taken during previous sessions may be added to a recipe for future use.

Additional Controls

The **Additional Controls** section of the **HDR Image Tools** panel contains the following additional controls that you can use with any HDR Expose tool. From left to right, these controls are:

- **Undo Last Action:** Clicking the **Undo Last Action** icon (trash can) removes your most recent action from the **History**.
- **Presets:** Clicking the **Presets** icon (sunburst) lets you work with presets, as described in "Presets" on page 60.
- **Preview:** Checking the **Preview** checkbox previews your edits in the HDR Expose window. You may also press [P] (PC or Mac).

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Status Bar

The **Status Bar** displays your image size in pixels and current zoom level. It also has several controls that let you customize the image display without affecting the image itself. From left to right, the controls are:

- **Choose Color Profile Menu (1):** The **Choose Color Profile** menu lets you select the display color model. Your available options are:
  - **Color Models:** The C**olor Profile** menu displays a list of the color profile(s) you have loaded. Select your desired color model by clicking it.
  - **Rendering Intent:** The **Rendering Intent** option helps you compensate for the limited color gamut available in current display technology by selecting how HDR Expose should map color or brightness information that exceeds your display's capabilities to the available color gamut. The available options are **Perceptual**, **Saturation**, **Relative Colorimetric**, and **Absolute Colorimetric**.
  - **Load Color Profile:** Selecting **Load Color Profile** opens a window that lets you load a color profile for the display you are currently using. Selecting the appropriate color model allows HDR Expose to offer the most accurate possible view of your image. You may load multiple color models and switch between them as described above.
  - **Clear List:** Selecting **Clear List** unloads the color model(s) you loaded.
- **Tint Menu (2):** The **Tint** menu lets you view your image with a tint filters applied. Selecting a tint filter converts your image display data to grayscale and then adds your desired tint. This only affects how the image appears on your screen; it does not affect the actual image data. You will have the option whether to apply the tint to the image itself when you save or export the image. The available default tint filters are: **None**, **Grayscale**, **Ivory**, **Sepia**, **Lavender Rose**, **Gold**, **Azure**, **Baby Blue**, and **Camouflage Green**. You may create new tint filters using the **Tint** tab of the **Preferences** window. Please see "Tint Tab" on page 31 for more information about creating tint filters.

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Status Bar (continued)

- **Bright Point Eyedropper (3):** The **Bright Point** eyedropper lets you select the brightest spot in your image. HDR Expose will adjust your image to make the selected spot appear as the brightest spot on your monitor. This only affects how the image is displayed on the screen for viewing purposes; it does not affect the actual brightness data in the image itself.
- **Reset Display Brightness Button (4):** Clicking the **Reset Display Brightness** button resets the default image display brightness. This only affects how the image is displayed on the screen for viewing purposes; it does not affect the actual brightness of the image itself.
- **Display Brightness Down Button (5):** Clicking the **Display Brightness Down** button reduces the display brightness. This only affects how the image is displayed on the screen for viewing purposes; it does not affect the actual brightness data in the image itself.
- **Display Brightness Slider (6):** Clicking and dragging the **Display Brightness** slider adjusts the display brightness up (right) or down (left). This only affects how the image is displayed on the screen for viewing purposes; it does not affect the actual brightness of the image itself.
- **Display Brightness Up Button (7):** Clicking the **Display Brightness Up** button increases the display brightness.
- **Actual Pixels Button (8):** Clicking the **Actual Pixels** button zooms your image to actual size.
- **Zoom Out Button (9):** Clicking the **Zoom Out** button zooms out farther from your image.
- **Zoom Slider (10):** Clicking and dragging the **Zoom** slider zooms your image in (right) or out (left).
- **Zoom In Button (11):** Clicking the **Zoom In** button zooms in closer to your image.
- **Zoom to Fit Button (12):** Clicking the **Zoom to Fit** button zooms in or out until your entire image fits within the HDR Expose window.
- **Zoom Percent Display (13):** Displays the level of zoom currently applied to the image you are working on.
- **Resize Handle (14):** Clicking and dragging the **Resize** handle lets you adjust the size of the HDR Expose window.

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Keyboard Shortcuts (PC)

HDR Expose includes the following keyboard shortcuts when using a PC:

- **[CTRL]+[O]:** Lets you open a single file in HDR Expose.
- **[CTRL]+[S]:** Saves the current image.
- **[CTRL]+[SHIFT]+[S]:** Lets you save the current image under a new filename and/or folder.
- **[CTRL]+[W]:** Closes the current image without exiting HDR Expose. You are prompted to save any unsaved changes.
- **[CTRL]+[H]:** Opens the **Merge to HDR** window, which lets you merge multiple images into a single HDR image. Please see "Creating/Merging HDR Images" on page 34 for more about merging images.
- **[CTRL]+[B]:** Lets you apply a recipe to multiple images. Please see "Batch Processing" on page 38 for more about batch processing.
- **[ALT]+[F4]:** Exits HDR Expose. You are prompted to save any unsaved changes.
- **[CTRL]+[C]:** Copies the current image to the Windows Clipboard.
- **[CTRL]+[V]:** Pastes the Windows Clipboard contents to the current image.
- **[CTRL]+[,]:** Opens the **Preferences** window, which allows you set various HDR Expose options. Please see "Preferences Window" on page 27 for more about the **Preferences** window.
- **[TAB]:** Toggles the **HDR Image Tools** panel on and off.
- **[CTRL]+[=]:** Zooms in closer to your image.
- **[CTRL]+[-]:** Zooms out farther from your image.
- **[Z]:** Zooms in or out until your entire image fits within the HDR Expose window.
- **[F]:** Toggles Fullscreen mode on and off.
- **[F1]:** Opens this manual in Adobe® Acrobat® format (PDF).
- **[SPACE]:** Toggles between the currently selected tool and the **Pan** tool (hand icon) that lets you move the image around within the HDR Expose window.
- **[P]:** Toggles the **Preview** checkbox on and off for the currently selected tool.
- **[CTRL]+[F]:** Opens the **Free Rotate** tool, which is described in "Rotate" on page 41.
- **[W]:** Opens the **Veiling Glare** tool, which is described in "Veiling Glare" on page 45.
- **[E]:** Opens the **Sharpness** tool, which is described in "Sharpness" on page 53.
- **[R]:** Opens the **Resize** tool, which is described in "Resize" on page 42.
- **[T]:** Opens the **Color Tuning** tool, which is described in "Color Tuning" on page 57.
- **[U]:** Opens the **Saturation** tool, which is described in "Saturation" on page 54.

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PC Keyboard Shortcuts (continued)

- **[I]:** Opens the **White Balance** tool, which is described in "White Balance" on page 55.
- **[S]:** Opens the **Shadow/Highlight** tool, which is described in "Shadow/Highlight" on page 51.
- **[C]:** Opens the **Crop** tool, which is described in "Crop" on page 43.
- **[B]:** Opens the **Free Rotate** tool, which is described in "Rotate" on page 41.
- **[N]:** Opens the **Noise Elimination** tool, which is described in "Noise Elimination" on page 47.
- **[M]:** Opens the **Dynamic Range Mapping** tool, which is described in "Dynamic Range Mapping" on page 59.

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Keyboard Shortcuts (Mac)

HDR Expose includes the following keyboard shortcuts when using a Mac:

Note: The ⌘ symbol signifies the [COMMAND] key and the ⌥ symbol signifies the [OPTION] key.

- **[⌘]+[,]:** Opens the **Preferences** window, which allows you set various HDR Expose options. Please see "Preferences Window" on page 27 for more about the **Preferences** window.
- **[⌘]+[H]:** Hides the HDR Expose window.
- **[⌥]+[⌘]+[H]:** Hides all other open application windows.
- **[⌘]+[Q]:** Exits HDR Expose. You are prompted to save any unsaved changes.
- **[⌘]+[O]:** Lets you open a single file in HDR Expose.
- **[⌘]+[S]:** Saves the current image.
- **[SHIFT]+[⌘]+[S]:** Lets you save the current image under a new filename and/or folder.
- **[⌘]+[W]:** Closes the current image without exiting HDR Expose. You are prompted to save any unsaved changes.
- **[H]:** Opens the **Merge to HDR** window, which lets you merge multiple images into a single HDR image. Please see "Creating/Merging HDR Images" on page 34 for more about merging images.
- **[⌘]+[B]:** Lets you apply a recipe to multiple images. Please see "Batch Processing" on page 38 for more about batch processing.
- **[⌘]+[C]:** Copies the current image to the MacOS Clipboard.
- **[⌘]+[P]:** Pastes the MacOS Clipboard contents to the current image.
- **[TAB]:** Toggles the **HDR Image Tools** panel on and off.
- **[⌘]+[=]:** Zooms in closer to your image.
- **[⌘]+[-]:** Zooms out farther from your image.
- **[Z]:** Zooms in or out until your entire image fits within the HDR Expose window.
- **[F]:** Toggles Fullscreen mode on and off.
- **[F1]:** Opens this manual in Adobe® Acrobat® format (PDF).
- **[SPACE]:** Toggles between the currently selected tool and the **Pan** tool (hand icon) that lets you move the image around within the HDR Expose window.
- **[P]:** Toggles the **Preview** checkbox on and off for the currently selected tool.
- **[⌘]+[F]:** Opens the **Free Rotate** tool, which is described in "Rotate" on page 41.
- **[W]:** Opens the **Veiling Glare** tool, which is described in "Veiling Glare" on page 45.

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Mac Keyboard Shortcuts (continued)

- **[E]:** Opens the **Sharpness** tool, which is described in "Sharpness" on page 53.
- **[R]:** Opens the **Resize** tool, which is described in "Resize" on page 42.
- **[T]:** Opens the **Color Tuning** tool, which is described in "Color Tuning" on page 57.
- **[U]:** Opens the **Saturation** tool, which is described in "Saturation" on page 54.
- **[I]:** Opens the **White Balance** tool, which is described in "White Balance" on page 55.
- **[S]:** Opens the **Shadow/Highlight** tool, which is described in "Shadow/Highlight" on page 51.
- **[C]:** Opens the **Crop** tool, which is described in "Crop" on page 43.
- **[B]:** Opens the **Brightness/Contrast** tool, which is described in "Noise Elimination" on page 47.
- **[N]:** Opens the **Noise Elimination** tool, which is described in "Noise Elimination" on page 47.
- **[M]:** Opens the **Dynamic Range Mapping** tool, which is described in "Dynamic Range Mapping" on page 59.

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Mouse Shortcuts

HDR Expose includes two mouse shortcuts:

- **Double click:** Double-clicking the mouse toggles Fullscreen mode on and off:
- **Scroll wheel:** Rotating the mouse scroll wheel zooms in and out of your image.

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Sliders and Fields

Many HDR Expose tools include both sliders and fields for a given setting, such as **Brightness** or **Highlight Power**. To use sliders, you may:

- Click and drag the slider to set the desired value,
- Click a spot on the slider track to "jump" the slider to that spot, or
- Double-click to reset the slider to its default position.
- Hover the mouse cursor over a field to see the minimum and maximum allowable values for that field.

Adjusting a slider changes the value in the associated field. You may also enter numerical values directly in the field itself by clicking the field and using the numeric keypad. Many fields let you make adjustments beyond the slider limitations. For example, the **Brightness** slider can make adjustments between +/-5f-stops; the Brightness EV field can make adjustments between +/-20f-stops.

Manually entering a value in a field also turns off the image preview. Check the **Preview** checkbox to apply the adjustments) you just made.

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Preferences Window

Selecting **Edit>Preferences** opens the **Preferences** window, which allows you to specify default options for HDR Expose. This window contains the following tabs:

- **General:** Set your desired image display mode and set various interface elements.
- **Export:** Set export options for each supported export format.
- **Batch:** Set default file types when exporting batch-processed or merged HDR files.
- **Presets:** Import and export HDR Expose preference files.
- **Recipes:** Import and export HDR Expose recipe files.
- **Performance:** Optimize HDR Expose performance for your computer.
- **Tint:** Create and delete tint presets for use in the **Tint** menu in the **Status Bar**.

General Tab

The **General** tab of the **Preferences** window lets you set the following general options:

- **Show Image Shadow:** Checking the **Show Image Shadow** checkbox places a drop shadow outside the image, which is visible when you are zoomed out.
- **Show Startup Dialog:** Checking the **Show Startup Dialog** checkbox displays the **Startup** dialog when you launch HDR Expose. Please see "Selecting Images" on page 34 for more information about the **Startup** dialog.
- **Show Highlight Recovery Dialog:** Checking the **Show Highlight Recovery Dialog** checkbox displays the Highlight Recovery slider in the **Manual White Balance** dialog that appears when you have set the default white balance option to **Manual** when merging images. or when importing RAW-format images. This feature lets you recover the white point in images with overblown highlights. Please see "The Manual White Balance Dialog" on page 39 for more information about the **Highlight Recovery** dialog.

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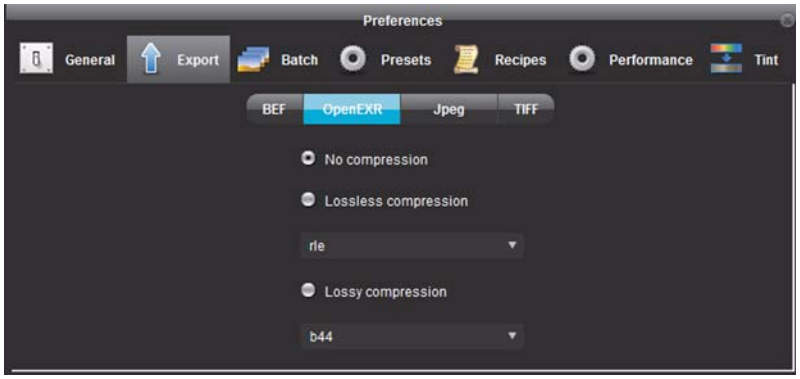
Preferences Window (continued)

Export Tab



The **Export** tab of the **Preferences** window lets you set the following image export options:

- **Export Format:** Click one of the export formats to select your desired export options for that format.
- **BEF Export Options:** Use the Quality slider to set your desired .BEF export quality. Checking the **Original Quality** checkbox preserves the quality of the original image(s).
- **Open EXR Export Options:** Use the radio buttons to select the following .EXR export options:
  - **No compression:** Checking the **No compression** radio button exports .EXR files with no compression. This preserves full image quality but requires additional disk space.
  - **Lossless compression:** Checking the **Lossless compression** radio button compresses exported .EXR files without losing image quality. This creates smaller files than non-compressed .EXR while preserving quality. Use the pull-down menu to select the type of compression to apply.
  - **Lossy compression:** Checking the **Lossy compression** radio button compresses exported .EXR files and impacts image quality. This creates the smallest possible files at the expense of image quality. Use the pull-down menu to select the type of compression to apply.
- **Jpeg:** HDR Expose lets you set the following .JPG export options:
  - **Quality:** Use the **Quality** slider to specify the overall image quality. Checking the **Original Quality** checkbox pre-serves the quality of the original image(s).
  - **Optimize:** Checking the **Optimize** checkbox reduces the image size on disk while preserving your overall quality setting.
  - **Progressive:** Checking the **Progressive** checkbox saves the image as layers of progressively detailed data.
  - **Embed ICC profile:** Checking the **Embed ICC Profile** checkbox embeds the selected color profile in the exported image. Click the **Browse** button to open an operating system dialog box that lets you navigate to your desired color profile.

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Preferences Window (continued)

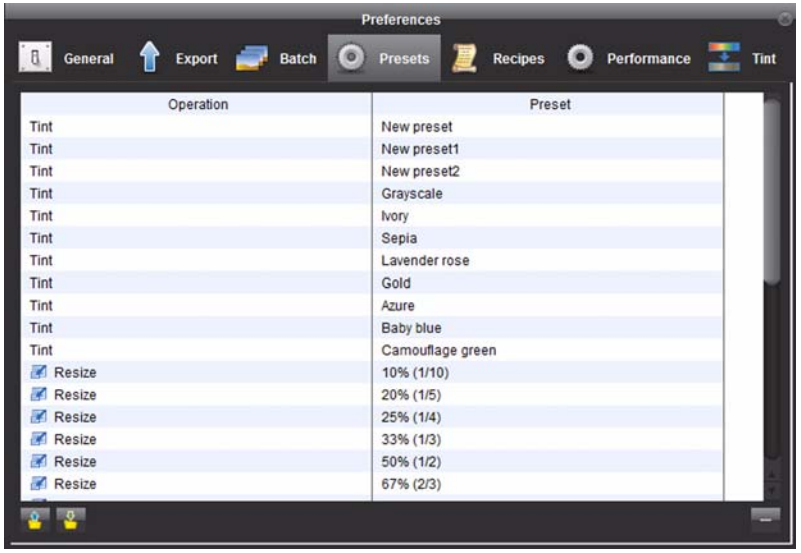
- **TIFF:** HDR Expose lets you set the following .TIF export options:
  - **Bits per pixel:** Use the pull-down menu to specify **8**, **16**, or **32** bits per pixel. Higher bit settings increase color depth but also increase file size.
  - **Embed ICC profile:** Checking the **Embed ICC Profile** checkbox embeds the selected color profile in the exported image. Click the **Browse** button to open an operating system dialog box that lets you navigate to your desired color profile.

Batch Tab

The **Batch** tab of the **Preferences** window lets you set the following batch/merged image export options:

- **Batch processing:** Use the pull-down menu to select the file type to use when exporting batch-processed files. Exported files will use the preferences you set in the **Export** tab. Please see "Export Tab" on page 28 for more information about setting image export options.
- **Batch Merge to HDR:** Use the pull-down menu to select the file type to use when exporting merged HDR files. Exported files will use the preferences you set in the **Export** tab. Please see "Export Tab" on page 28 for more information about setting image export options.

Presets Tab



The **Presets** tab of the **Preferences** window lets you delete, import, and export HDR Expose presets.

- Select one or more presets by clicking them. You may click and drag to select multiple presets.
- Import presets from another HDR Expose installation by clicking the **Import** button and then selecting the file to import.

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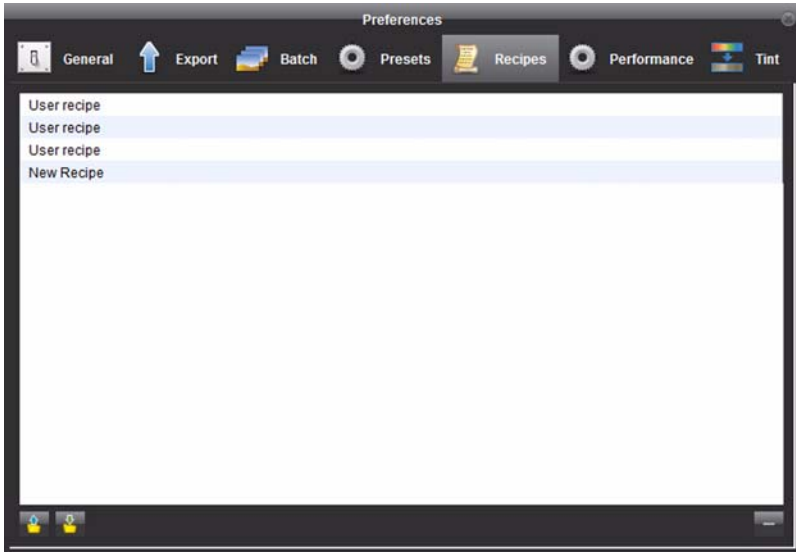
Preferences Window (continued)

- Export presets to another HDR Expose installation by selecting the preset(s) to export and then clicking the **Export** button and selecting a filename and folder for the exported presets.
- Delete presets by selecting the preset(s) you want to delete and then clicking the **Delete** button.

Recipes Tab

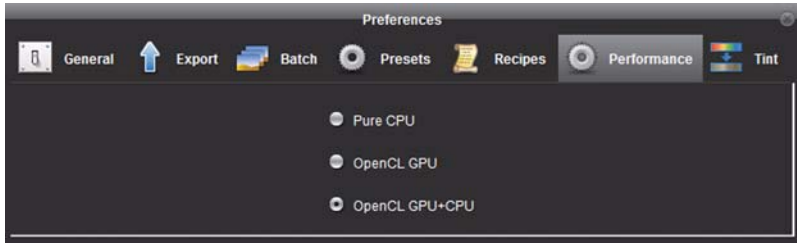


The **Recipes** tab of the **Preferences** window lets you delete, import, and export HDR Expose recipes.

- Select one or more recipes by clicking them. You may click and drag to select multiple recipes.
- Import recipes from another HDR Expose installation by clicking the **Import** button and then selecting the file to import.
- Export recipes to another HDR Expose installation by selecting the recipe(s) to export and then clicking the **Export** button and selecting a filename and folder for the exported recipes.
- Delete recipes by selecting the recipe(s) you want to delete and then clicking the **Delete** button.

Please see “Recipes” on page 61 for more information about recipes.

Performance Tab



The **Performance** tab of the **Preferences** window lets you optimize HDR Expose to your system’s capabilities.

- Checking the **Pure CPU** radio button uses only the computer CPU to perform calculations; the video processor (GPU) is not used. This option is best for systems with older video cards.

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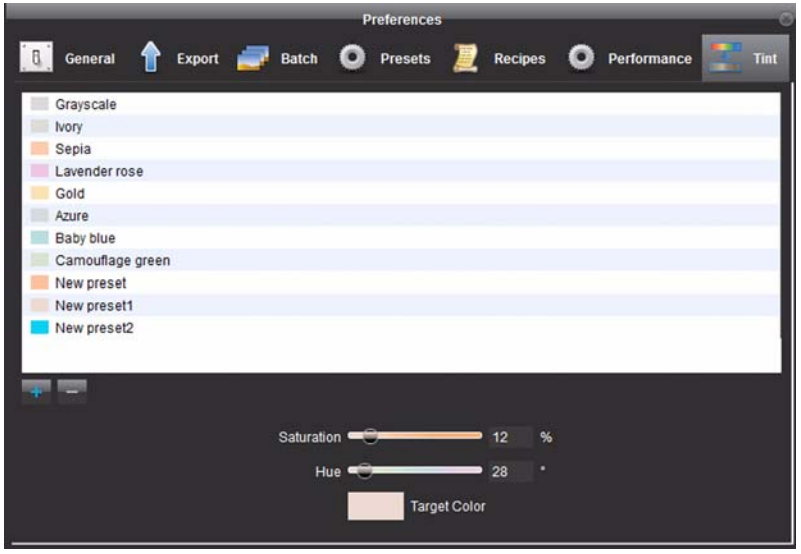
- Checking the **OpenGL GPU** radio button uses only the video card GPU to perform calculations; the computer CPU is not used. This option is best for computers with slower CPUs.
- Checking the **OpenGL GPU+CPU** radio button uses both the video card GPU and the computer CPU to perform calculations. This options is best for high-performance systems.

Tint Tab



The **Tint** tab of the **Preferences** window allows you to create and delete preset tint filters that you can apply to your images using the **Tint** menu in the **Status Bar**. Please see "Status Bar" on page 19 for more information about the **Status Bar**.

To create a new tint filter:

1. Use the **Saturation** slider and/or field to adjust the amount of tint saturation in the image. Values above 1 increase the tint saturation of the selected hue; values below 1 decrease the saturation of the selected hue.
2. Use the **Hue** slider and/or field to adjust the tint hue.
3. Click the **Add Tint** button (**+**) to create the new tint. Enter your desired name for the new tint in the **New** preset field.

*Note: Note: You may also click the **Add Tint** button and then select your desired hue and saturation.*

To delete a tint preset, click the tint you want to delete and then click the **Delete Tint** (**-**) button.

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Using HDR Expose

This chapter describes how to use the tools included with HDR Expose to create breathtaking results. HDR Expose makes image editing fast, easy, and fun.

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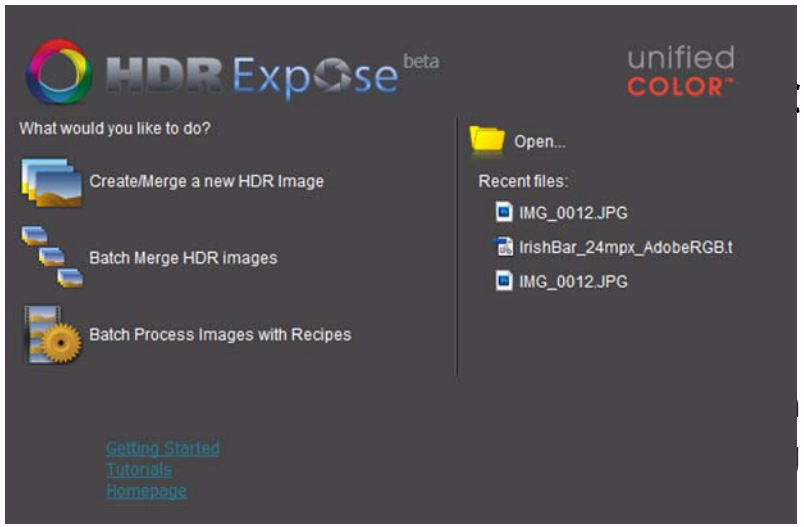
Selecting Images

There are four ways to add images for editing in HDR Expose:

- **Creating/merging a new HDR image:** Opens the **Merge to HDR** window with the **Custom Merge** tab selected, which lets you merge multiple images to form a single HDR image. You can also press [CTRL]+[H] (PC).
- **Batch HDR Merge:** Opens the **Merge to HDR** window with the **Batch merge** tab selected, which lets you merge multiple sets of images to form a series of HDR image.
- **Batch processing:** Applies a recipe to your selected images. You can also press [CTRL]+[B] (PC) or [⌘]+[B] (Mac).
- **Opening an existing image:** Opens an existing normal or HDR image for editing. You can also press [CTRL]+[O] (PC) or [⌘]+[O] (Mac).

By default, the **Welcome to HDR Expose** window appears when you launch HDR Expose. Select one of the above options by clicking the appropriate button. You can also access support information by clicking the links at the bottom of this window.



Merging HDR Images

Merging several bracketed images captures all of the details visible to the human eye, thereby enhancing the HDR image by preventing the blow-outs or clipping that can occur when using a single image. In general, most HDR images require three bracketed exposures of the same scene (-2f-stop, normal f-stop, and +2f-stop). Most cameras can take three bracketed exposures; refer to your camera's documentation for instructions.

Some situations, particularly those with varying light and contrast, may require as many as five to seven images or even more, with a wider range of exposures and/or with narrower EV gaps between each exposure. After merging,

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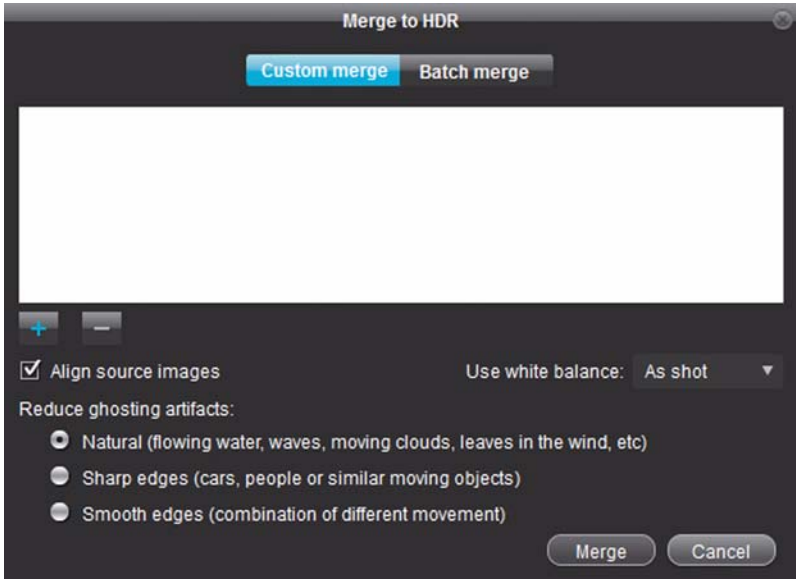
Selecting Images (continued)

you may continue mapping the resulting image to obtain your desired dynamic range using the HDR Expose editing tools.

The **Merge to HDR** window is where you add images for merging. You can open this window by:

- Clicking the **Create/Merge a new HDR image** or **Batch HDR merge** button in the **Welcome to HDR Expose** window when you first launch the program.
- Selecting **File>Merge to HDR**.
- Pressing [CTRL]+[H] (PC).
- Dragging your desired images into the HDR Expose window.

Custom Merge:



To merge one set of images into a single HDR image:

1. Open the **Merge to HDR** window using any of the above methods and then click the **Custom merge** button.
2. Click the **Add Images** button (**+**) to navigate to and select the images to add for merging. You can select multiple images by pressing [CTRL] (PC) or [⌘] (Mac) and clicking your desired images. You may also add images one by one by repeating this step for each image you want to add. To remove an image, click the **Remove Images** button (**-**).
3. Checking the **Align Source Images** checkbox aligns all of the single images to present a single clear result. This option is useful if there is any chance that the camera moved in between shots because of vibration, accidental nudging, etc.
4. Choose the white balance mode using the pull-down menu. Your options are:
   - **Default:** Unchanged camera sensor values (typically calibrated to daylight).
   - **As shot:** Use the camera-supplied white balance correction that was recorded when you took the picture.

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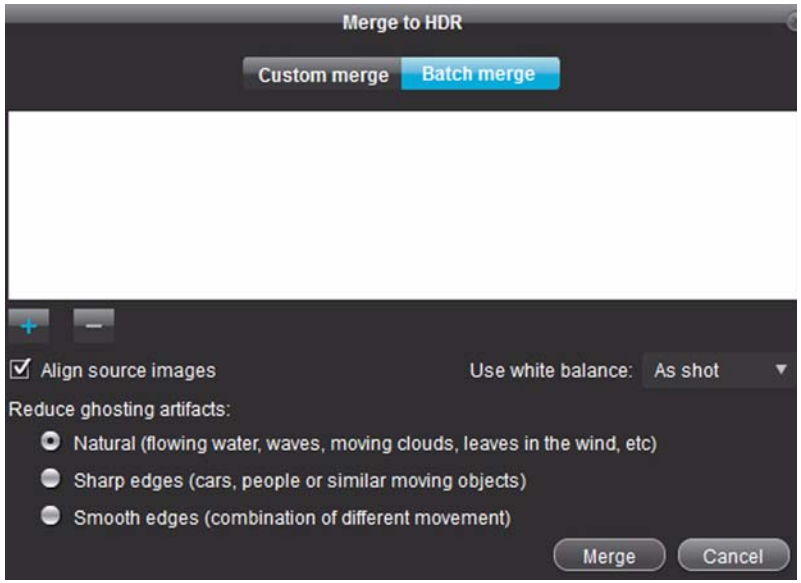
Selecting Images (continued)

- **Manual:** Opens the up the **Manual White Balance** options dialog in the **HDR Image Tools** panel after merging the images, which allows you to set the image white balance. Please see "The Manual White Balance Dialog" on page 39 for more information about the **Manual White Balance** dialog.

5. Ghosting artifacts can occur when there are minor differences between exposures, such as a leaves blowing in the wind, etc. Check the appropriate radio button to specify how HDR Expose should handle ghosting artifacts:
   - **Natural:** This option is good when the exposures contain soft-edged moving objects such as flowing water, leaves, etc.
   - **Sharp edges:** This option is good when the exposures contain hard-edged moving objects such as people, vehicles, etc.
   - **Smooth edges:** This option is good when the exposures contain a combination of moving objects.
6. When you have finished adding images and selecting your desired options, click the **Merge** button to merge the images into a single HDR image using the preferences you selected in the **Batch** tab of the **Preferences** window, which is described in "Batch Tab" on page 29.

HDR Expose merges the source images and generates a stunning HDR result. This may take a few minutes depending on the size and number of images being merged.

Batch Merge:



To merge multiple sets of images into a single HDR image:

1. Open the **Merge to HDR** window using any of the above methods and then click the Batch merge button.
2. Click the **Add Images** button (**+**) button to open the **Browse for Folder** window, which allows you to specify the number of images in each scene and the folder containing the source images. The selected folder must contain the same number of source files for each HDR scene. For example, you cannot merge HDR images from 3 or 5 sources in the same folder; the images with 3 sources must be placed in a separate folder from the images with 5 sources and merged separately.

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Selecting Images (continued)

3. Checking the **Align Source Images** checkbox aligns all of the single images to present a single clear result. This option is useful if there is any chance that the camera moved in between shots because of vibration, accidental nudging, etc.
4. Choose the white balance mode using the pull-down menu. Your options are:
   - **Default:** Unchanged camera sensor values (typically calibrated to daylight).
   - **As shot:** Use the camera-supplied white balance correction that was recorded when you took the picture.
   - **Manual:** Opens the up the **Manual White Balance** options dialog in the **HDR Image Tools** panel after merging the images, which allows you to set the image white balance. Please see "The Manual White Balance Dialog" on page 39 for more information about the **Manual White Balance** dialog.
5. Ghosting artifacts can occur when there are minor differences between exposures, such as a leaves blowing in the wind, etc. Check the appropriate radio button to specify how HDR Expose should handle ghosting artifacts:
   - **Natural:** This option is good when the exposures contain soft-edged moving objects such as flowing water, leaves, etc.
   - **Sharp edges:** This option is good when the exposures contain hard-edged moving objects such as people, vehicles, etc.
   - **Smooth edges:** This option is good when the exposures contain a combination of moving objects.
6. When you have finished adding images and selecting your desired options, click the **Merge** button to merge the images into a single HDR image using the preferences you selected in the **Batch** tab of the **Preferences** window, which is described in "Batch Tab" on page 29.

HDR Expose merges the source images and generates a stunning HDR result. This may take a few minutes depending on the size and number of images being merged.

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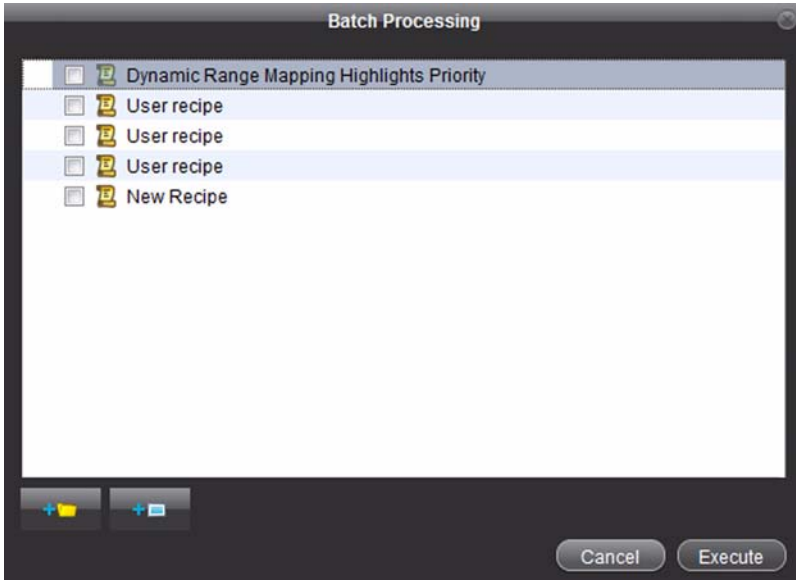
Selecting Images (continued)

Batch Processing

Batch processing applies a recipe (a stored series of actions) to multiple images at once, ensuring absolutely consistent results while also saving you time. In general, you should only batch images that are very similar in terms of brightness and color content, such as different shots of the same scene. Applying the same recipe to images that do not share common brightness and/or contrast information can yield unexpected results. Please see "Recipes" on page 61 for more about recipes.



The **Batch Processing** window is where you add images for batch processing. You can open this window by:

- Clicking the **Batch processing** button in the **Welcome** to HDR Expose window when you first launch the program.
- Selecting **File>Batch** processing.
- Pressing [CTRL]+[B] (PC) or [⌘]+[B] (Mac)].

To merge images:

1. Open the **Batch Processing** window using any of the above methods.
2. Check the checkbox that corresponds to the recipe you want to apply in the **Source files** area.
3. To add an entire folder of images, click the **Add Folder** button and navigate to the desired folder. All of the images in the selected folder appear under the selected recipe.
4. To add specific images, click the **Add Images** button and navigate to the desired image(s). You may add multiple images by pressing [CTRL] (PC) or [⌘] (Mac) while selecting the images to add. All of the selected images appear under the selected recipe.

Note: If you add an image by mistake, clear the checkbox next to that image to skip it during batch processing.

5. Continue adding images and/or folders to recipes by repeating Steps 2-4 as needed.

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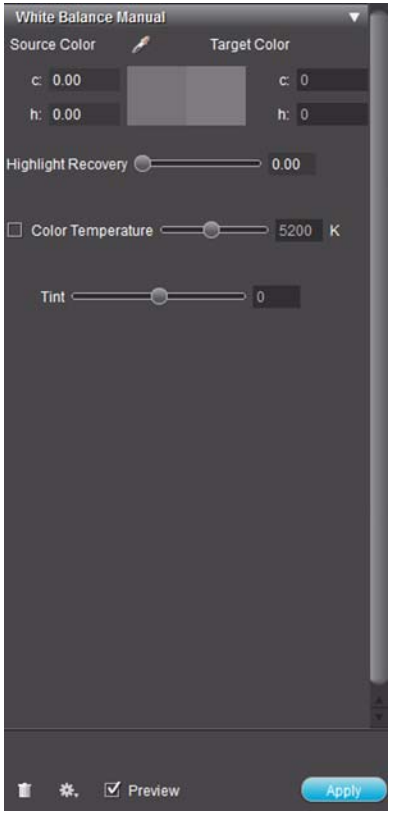
6. Click the **Execute** button to perform the batch processing. Images will be saved according to the preferences you selected in the **Batch** tab of the **Preferences** window, which is described in "Batch Tab" on page 29.

The Manual White Balance Dialog

White balance adjustments correct for the lighting conditions when the shot was taken and simulate the eye's natural chromatic adaptation process whereby the eye adjusts its color perception to correct for different lighting.

The **Manual White Balance** dialog appears when you specify **Manual** white balance in the **Merge to HDR** window while performing a custom or batch merge. To manually apply white balance corrections to the merged images:

1. Use the **Source Color** eyedropper to select a point on the image that will be made white according to the D65 white point standard. All other colors in the image will be adjusted accordingly.
2. The **Highlight Recovery** slider lets you to recover the white point in raw images that have overblown highlights. Moving the slider to the right increases the amount of highlight recovery.
3. If desired, specify a color temperature by checking the **Color Temperature** checkbox and then either using the **Color Temperature** slider or entering your desired temperature in the **Color Temperature** field. Moving the slider to the right makes the image look cooler, and moving it to the left makes the image look warmer.
4. If desired, adjust the image tint using the **Tint** slider.
5. Click **Apply** to adjust the white balance.



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History

The **History** section of the **HDR Image Tools** panel records your previous 255 actions. New actions are added to the bottom of the history. You can work with the history as follows:

- Create a recipe that will apply the contents of the history to the current or future images in one click. Please see "Recipes" on page 61 for more information about creating recipes.
- Undo your most recent action by clicking the **Undo** icon (trash can) at the bottom of the **HDR Image Tools** panel.
- Undo any of your previous actions by clicking the action you want to delete and then pressing [DEL]. HDR Expose recalculates your image edits to remove the deleted action(s).
- Adjust any of your previous actions by clicking the action you want to modify and then making your desired adjustments. HDR Expose recalculates your image edits to apply the modified action(s).

The **History** section may contain any combination of actions, including multiple instances of the same action. For example, adjusting the image brightness and contrast, then changing the color saturation, and then adjusting the brightness and contrast again creates two **Brightness/Contrast** entries in the **History**, one on each side of the **Saturation** entry.

Note: Unsaved actions are not preserved after the image is closed or if you save the image to any format other than BEF. You can only undo actions taken during the current session. Actions taken during previous sessions may be added to a recipe for future use.

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Rotate

HDR Expose lets you rotate images freely or in 90-degree increments.

Fixed

You can rotate the image in 90-degree increments by clicking the **Rotate CW** and **Rotate CCW** buttons in the **HDR Image Tools** panel.

- Clicking the **Rotate CW** button rotates the image 90 degrees clockwise (right).
- Clicking the **Rotate CCW** button rotates the image 90 degrees counterclockwise (left).

Free-Angle

In addition to the 90-degree rotation described above, you can also freely rotate the image using a specified horizon line. Clicking the **Free Rotate** button in the **HDR Image Tools** panel opens the **Free Rotate** window and draws a horizontal yellow line across the image.

The **Free Rotate** window lets you specify whether HDR Expose treats the line as **Horizontal** or **Vertical**. In most cases, selecting **Automatic** is the best option because it allows HDR Expose to calculate the most appropriate rotation based on the angle of the line. The line serves as the horizon to which the image will align when rotate.

1. Specify the rotation angle by either:
   - Clicking and dragging the line end points to rotate the line.
   - Drawing a new line by clicking your desired starting point, dragging to your desired end point, and then releasing the mouse button.
2. Click **Apply** to rotate the image.

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Resize

Resizing your image enlarges or shrinks it without cropping. You may resize by pixel size or percentage and can either maintain the image's current proportions or specify new proportions to distort the image horizontally and/or vertically.

To resize your image:

1. Click the **Resize** tool in the **HDR Image Tools** panel to open the **Resize** window.
2. Use the pull-down menu to select either **px** (pixels), **%** (percentage or original size), **inch** (inches), or **cm** (centimeters).
3. Check the **Constrain Proportions** checkbox if you want to preserve your image's current aspect ratio (ratio of width to height). Checking this box automatically enters a new **Height** value when you change the image Width and vice-versa. Clearing this checkbox lets you specify and horizontal and vertical size you like, which may distort the image horizontally and/or vertically.
4. Enter your desired values in the **Height** and/or **Width** fields. Resizing the image results in an image with X and Y pixel sizes equal to the length and height times the DPI setting.
5. Enter your desired resolution in dots per inch in the **DPI** field. This setting is used primarily for printing. Increasing the DPI without increasing the physical size of the image increases the pixel resolution without altering the X and Y pixel size of the image.
6. Click **Apply** to resize the image.

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Crop

Cropping an image removes unwanted portions of that image. HDR Expose dims the image when you select this option and your selected cropping area appears at normal brightness. This gives you a visual indication of the area of your image that will remain after the cropping is completed.

HDR Expose has three crop modes:

- **Free selection:** Choose your desired cropping area.
- **Fixed size:** Specify your desired crop size and then select the area to crop.
- **Aspect Ratio:** Crop your image to a predefined aspect ratio (width:height). This is useful if you are planning to insert the image into a video.

Checking the **Grid** checkbox in the **Crop** window displays a grid inside the cropping area.

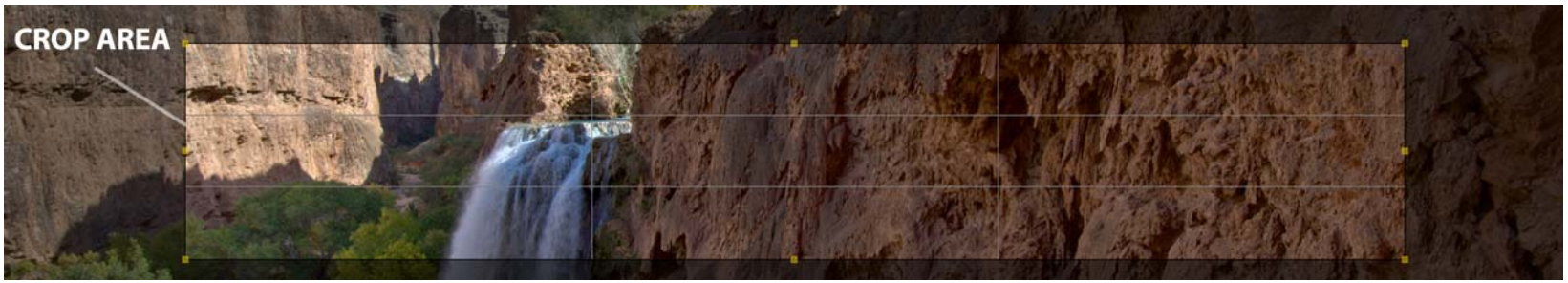
Checking the **Anchors** checkbox in the **Crop** window displays draggable anchor points on the sides and in the corners of the cropping area.

The **Cropping** tool also displays the number of selected megapixels in the **Mpx** field.

Free Selection

To crop your image using free selection:

1. Click the **Crop** tool in the **HDR Image Tools** panel to open the **Crop** window.
2. Select **Free Select** in the pull-down menu.
3. Click and drag the mouse over the image to select your cropping area. If you make a mistake, either repeat the click and drag to create a new cropping area or click anywhere inside the cropping areas to drag it around the image. You may also resize the cropping area



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Cropping (Continued)

by either clicking and dragging the anchor points on each side and in each corner of the cropping areas, or by entering numeric values in the **Width x Height X** and **Width x Height Y** fields.

4. Click **Apply** to crop the image.

Fixed Size

To crop your image to a fixed size:

1. Click the **Crop** tool in the **HDR Image Tools** panel to open the **Crop** window.
2. Select **Fixed Size** in the pull-down menu.
3. Enter your desired cropping area width and height in the **Width x Height X** and **Width x Height Y** fields, respectively. You may edit these values at any time.
4. A cropping area appears in your image. Click and drag to position the cropping area wherever you like, or click anywhere in your image to create a new cropping area with your specified size.
5. Click **Apply** to crop the image.

Aspect Ratio

To crop your image to a specified aspect ratio:

1. Click the **Crop** tool in the **HDR Image Tools** panel to open the **Crop** window.
2. Select A**spect Ratio** in the pull-down menu.
3. Select your desired aspect ratio using the **Aspect Ratio** pull-down menu.
4. Click and drag the mouse over the image to select your cropping area. The cropping area may be any size, but will retain your specified width-to-height ratio. If you make a mistake, either repeat the click and drag to create a new cropping area or click anywhere inside the cropping areas to drag it around the image. You may also resize the cropping area by either clicking and dragging the anchor points on each side and in each corner of the cropping areas, or by entering numeric values in the **Width x Height X** and **Width x Height Y** fields.
5. Click **Apply** to crop the image.

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Veiling Glare

Veiling Glare is a type of lens glare that reduces image contrast. It appears as a whitish haze over the image and is a particular problem in HDR images because of the multiplying effect of merging multiple shots. Atmospheric haze can also reduce the contrast and detail of any image. The HDR Expose **Veiling Glare** tool can remove this haze, or even add additional haze depending on your needs. You can also use this tool to obtain very deep blacks, especially for night shots.

To adjust the level of veiling glare in the image:

1. Click the **Veiling Glare** tool in the **HDR Image Tools** panel to open the **Veiling Glare** window.
2. The default base point setting is the point of minimum brightness. You may use either the eyedropper or the **Base point** slider to set your desired base point in the image.
3. Adjust the amount of veiling glare taken from the selected point by either using the slider or entering a numeric amount in the **Amount** field. You can toggle between the original and modified image by clicking the **Preview** button to ensure that you are getting good results.
   - Setting the value to -100% completely removes all veiling glare from the selected point.
   - Setting the value to +100% doubles the amount of veiling glare at the selected point.
4. Click **Apply** to adjust the veiling glare.

For most images, setting the black point produces the best results. To do this, find a spot in your image that you know should be black. Zooming into this spot usually reveals a whitish haze, which is the actual veiling glare. Setting this spot as your black

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Veiling Glare (continued)

point and then setting the amount at or near -100% makes the selected spot go completely black and also makes your image colors more vivid. The very deep blacks produced by this technique are especially useful for nighttime photographs.

You may also choose a non-black point if you notice haze in any other part of your image, such as atmospheric haze or mist. Select a point in this area and use the necessary amount of adjustment to remove this haze. In this situation, you should use the **Veiling Glare** tool with care, because excessive values can distort the colors in the rest of your image.

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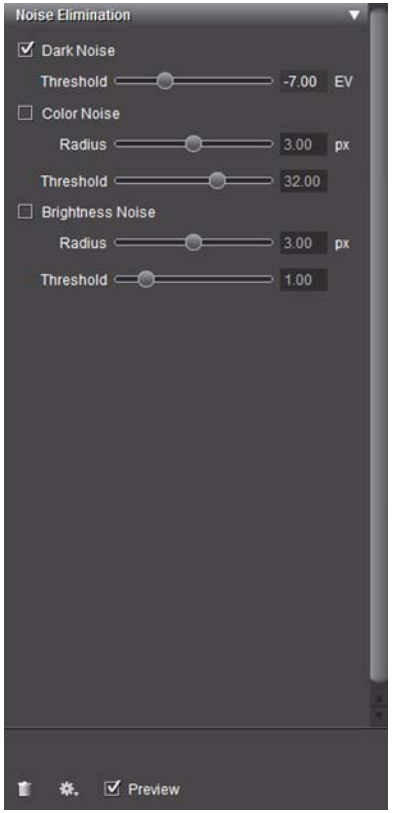
Noise Elimination

Noise reduction helps lower the amount of brightness and/or color noise in the image for a cleaner look. HDR Expose offers separate brightness and color channel noise reduction. Reducing brightness noise preserves the edges between light and dark areas without blurring them. The unique and powerful color noise reduction algorithm smooths the color noise that is typically present even in low-ISO images.

To reduce noise:

1. Click the **Noise Elimination** tool in the **HDR Image Tools** panel to open the **Noise Elimination** window. Noise reduction is a time-consuming process that requires many calculations; the preview area improves performance. You may click and drag the preview area to see how the noise reduction will affect any given part of your image.
2. Dark noise appears as colored dots in dark areas of the image and becomes more evident at higher ISO values. Check the **Dark Noise** checkbox if you want to reduce dark noise.
3. Adjust the strength of the dark noise reduction using the color **Threshold** slider or field. Larger values increase the threshold EV. Images areas that are below the threshold EV will have dark noise reduction while levels above this value will retain their original pixel values. High levels of noise reduction may obscure fine details.
4. Check the **Color Noise** checkbox if you want to reduce color noise.
5. Adjust the desired color noise reduction radius in pixels using the color **Radius** slider or **Radius px** field. Larger values create smoother results but may obscure fine details.



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Noise Elimination (continued)

6. Adjust the strength of the color noise reduction using the color **Threshold** slider or field. Larger values increase the amount of noise reduction but may obscure fine details.
7. Check the **Brightness Noise** checkbox if you want to reduce brightness noise.
8. Adjust the desired brightness noise reduction radius in pixels using the brightness **Radius** slider or **Radius px** field. Larger values create smoother results but may obscure fine details.
9. Adjust the strength of the brightness noise reduction using the brightness **Threshold** slider or field. Larger values increase the amount of noise reduction but may obscure fine details.
10. Click **Apply** to reduce the image noise. This operation may take a few minutes to complete.

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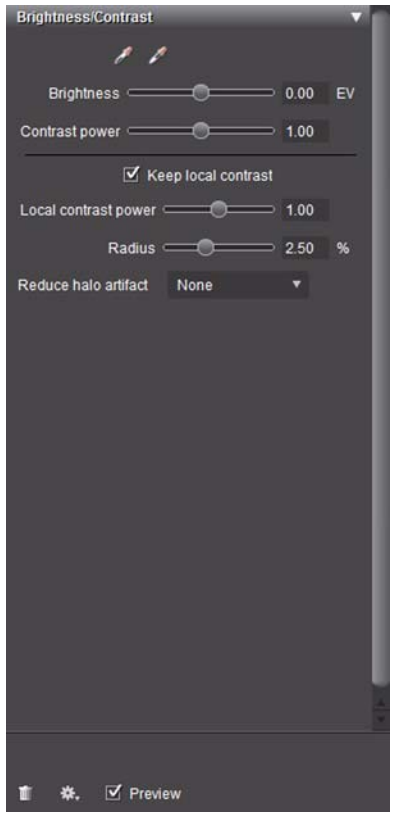
Brightness/Contrast

Brightness channel

Dynamic range mapping is the amount of brightness and contrast in your image. Brightness defines the overall luminance in the image while contrast (or "dynamic range") defines the ratio between the darkest and lightest parts of the image. A standard RGB (sRGB) image typically has a maximum contrast of around 3700:1 while a typical outdoor scene can have a ratio of around 1,000,000:1. HDR Expose offers you the full range of contrast visible to the human eye, even if you may not be able to see it on your display.

HDR Expose uses two different types of contrasts:

- **Global:** Global contrast adjusts the image's overall contrast level. Adjust global contrast using the Contrast power slider.
- **Local:** Local contrast adjusts the contrast of smaller image details. This function is similar to the "detail contrast" or "micro-contrast" settings available in other imaging applications. Use local contrast to emphasize details relative to each other using the same radius relative to the overall image size. Adjust local contrast using the Local contrast power slider.



Global and local contrast are typically reciprocal values. Increasing global contrast reduces local contrast, and vice-versa. This allows HDR Expose to compensate for contrast changes made at either the global or local level. You can disable this feature by un-checking the **Keep local contrast** checkbox.

To adjust image brightness and contrast:

1. Click the **Brightness/Contrast** tool in the **HDR Image Tools** panel to open the **Brightness/Contrast** window.

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Brightness/Contrast (continued)

2. Set the bright or 18% point on the image, as follows:
   - To select the bright point, select the **Set bright point** eyedropper and then click the desired point on the image. HDR Expose calculates the appropriate brightness change to make the selected point the brightest point on your monitor.
   - To select the 18% gray point, select the **Set 18% point** eyedropper and set the 18% brightness point. This is particularly useful if your image contains one or more faces because selecting a spot on a face as the 18% point usually gives the best results. HDR Expose calculates the appropriate brightness change to make the brightest point on the monitor 82% brighter than the selected 18% point.
3. Make further brightness adjustments as needed using the **Brightness** slider and/or by entering a number in the **Brightness EV** field, which has a maximum range of -20f-stop to +20f-stop.
4. Adjust the contrast using the **Contrast power** slider and/or **Contrast power EV** field.
5. Check the **Keep local contrast** checkbox if you want to maintain the default inverse relationship between image contrast and local contrast. Clearing this checkbox lets you set local contrast independently of overall contrast.
6. Adjust the local contrast using the **Local contrast power** slider and/or **Local contrast power EV** field.
7. Adjust the local contrast radius using the **Radius** slider and/or field. Smaller settings contrast smaller image details while larger settings affect larger image features. The radius is specified as a percentage of the overall image size. For example, a radius of 1% will equal 1/100th of the image's largest dimension.
8. If needed, use the **Reduce halo artifact** pull-down menu for the level of reduction needed. The different settings control the speed vs. quality trade-off when reducing halo effects. For example, the **Preview** setting is very fast but low quality while the **Ultimate** setting is slower but offers high quality elimination of both the halo and halo edge artifacts.
9. Click **Apply** to adjust the image brightness and contrast.

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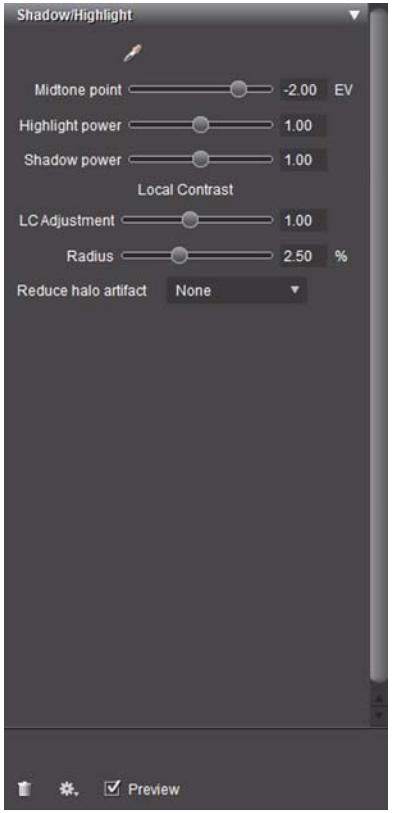
Shadow/Highlight

Brightness channel

The **Shadow/Highlight** tool lets you control the brightness of image highlights and/or shadows independently of each other.

To adjust the image shadows and highlights:

1. Click the **Shadow/Highlight** tool in the **HDR Image Tools** panel to open the **Shadow/Highlight** window.
2. Select the image midpoint. You may do this using the **Midtone point** eyedropper or by entering a value in the **Midtone point EV** field. The midpoint is expressed in f-stops (EV) below the image bright point.
3. Adjust the highlight power using the **Highlight power** slider and/or **Highlight power EV** field. This adjusts the relative strength of the image's bright areas (areas that are brighter than the selected mid tone value).
4. Adjust the shadow power using the **Shadow power** slider and/or **Shadow power EV f**ield. This adjusts the relative strength of the image's shadow areas (areas that are less bright than the selected mid tone value).
   - Adjust the local contrast power using the **LC Adjustment** slider and/or field. This gives you additional control over the strength of local contrast when changing the brightness levels in shadows and/or highlights.
   - Adjust the local contrast radius using the **Local Contrast Radius** slider and/or field. Smaller settings contrast smaller image details while larger settings affect larger image features. The radius is specified as a percentage of the overall image size. For example, a radius of 1% will



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Shadow/Highlight (continued)

equal 1/100th of the image's largest dimension.

5. If needed, use the **Reduce halo artifact** pull-down menu for the level of reduction needed. The different settings control the speed vs. quality trade-off when reducing halo effects. For example, the **Preview** setting is very fast but low quality while the **Ultimate** setting is slower but offers high quality elimination of both the halo and halo edge artifacts.
6. Click **Apply** to adjust the image shadows and highlights.

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Sharpness

Brightness channel

HDR Expose adjusts image sharpness on a pixel by pixel basis. You may need to zoom into the image to the pixel level to see the effect, especially when working with small adjustments and/or a small radius. The **Sharpness** tool makes your image sharper or blurrier.

To adjust image sharpness:

1. Click the **Sharpness** tool in the **HDR Image Tools** panel to open the **Sharpness** window.
2. For best results, click the **1:1** button in the **Status Bar** to see your image in full detail.
3. Use the **Power** slider and/or field to adjust the sharpness. Values above 1 sharpen your image; values below 1 blur your image.
4. Adjust the **Radius** slider and or/field to adjust the sharpness radius, in pixels. In most cases, a high **Power** and small **Radius** will give you the best sharpening results.
5. Click **Apply** to adjust the image sharpness.

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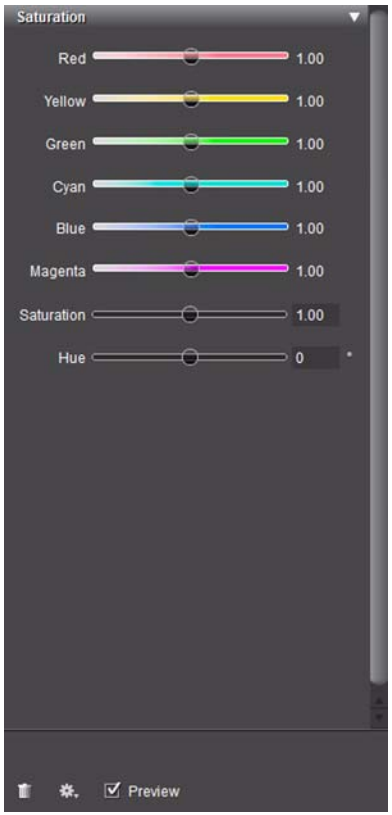
Saturation



Color channel

Saturation describes the amount of white light in a color. The closer a specific color is to white, the less saturated it is, and vice-versa. The HDR Expose **Saturation** tool lets you adjust your image saturation and hue. You can also control the saturation levels of six independent color channels (red, yellow, green, cyan, blue, and magenta) using the C**olor Tone Equalizer** sliders.

1. Click the **Saturation** tool in the **HDR Image Tools** panel to open the **Saturation** window.
2. Use the **Color Tone Equalizer** sliders and/or fields to adjust the saturation for each of the six color channels. Values above 1 increase the saturation of the selected color channel; values below 1 decrease the saturation for the selected color channel.
3. Use the **Saturation** slider and/or field to adjust the overall amount of saturation in the image. Values above 1 increase the saturation of all color channels; values below 1 decrease the saturation of all color channels.
4. Use the **Hue** slider and/or field to adjust the overall image hue. Small adjustments are usually best.
5. Click **Apply** to adjust the image saturation and hue.

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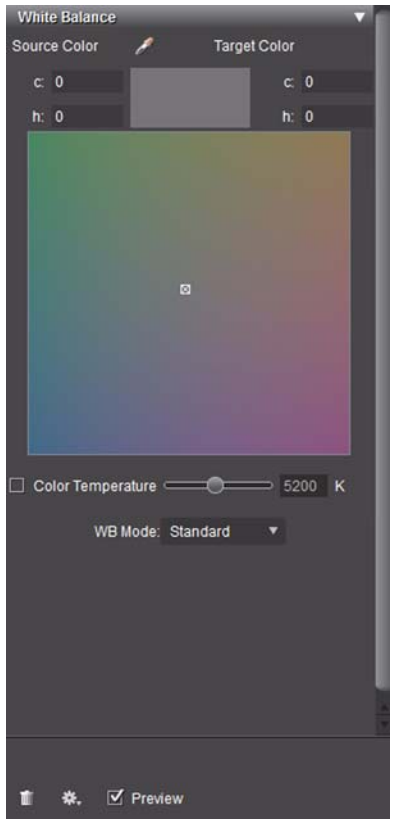
White Balance

Color and Brightness channels

White balance adjustments correct for the lighting conditions when the shot was taken and simulate the eye's natural chromatic adaptation process whereby the eye adjusts its color perception to correct for different lighting. Most white balance adjustments are done by selecting a white point in the image or by using a gray index card and/or specifying a preset (such as **Tungsten** or **Fluorescent Cool**). HDR Expose lets you perform a "white balance" adjustment using any color tone, which lets to change any source color into any other color. This is a very powerful way to adjust your image's color balance.

To adjust white balance:

1. Click the **White Balance** tool in the **HDR Image Tools** panel to open the **White Balance** window.
2. Select the white balance mode using the **WB Mode** pull-down menu. The **Standard** option corresponds to the standard CIE CAM Bradford algorithm. You may also select the **Unified Color** algorithm, which will not change the brightness levels in your image. Select the **Unified Color** algorithm when performing non-white adjustments.
3. Use the **Source Color** eyedropper to select a point on the image that will be made white according to the D65 white point standard. All other colors in the image will be adjusted accordingly. If you are performing a non-white adjustment, select the desired non-white tone that you will then correct using the **Gamut** control.
4. The **Gamut** control is where you select the exact target color by left-clicking the desired color. You can zoom the color gamut in and out for fine adjust-



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White Balance (continued)

ments by scrolling the mouse wheel. You may also move the gamut by right-clicking and dragging it.

5. If desired, specify a color temperature by checking the **Color Temperature** checkbox and then either using the **Color Temperature** slider or entering your desired temperature in the **Color Temperature** field. Moving the slider to the right makes the image look cooler, and moving it to the left makes the image look warmer.
6. Click **Apply** to adjust the white balance.

The following lists some common color temperature settings:

- **1,700K:** Match flame
- **1,850K:** Candle flame
- **2,700–3,300K:** Incandescent light bulb
- **3,350K:** Studio "CP" light
- **3,400K:** Studio lamps, photo floods, etc.
- **4,100K:** Moonlight, xenon arc lamp
- **5,000K:** Horizon daylight
- **5,500–6,000K:** Typical daylight, electronic flash
- **6,500K:** Daylight, overcast
- **9,300K:** CRT screen

*Note: HDR Expose includes several commonly used white balance presets, which you can apply by clicking the **Preset** button and selecting your desired preset.*

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Color Tuning

Color and Brightness channels

Color tuning lets you fine-tune specific color tones without affecting any of the other colors in your image. This tool lets you make the grass greener… or make the sky a different shade of blue. You can also use it to match skin tones. These are just a few examples of the dramatic changes you can make with just a few mouse clicks. The HDR Expose **Color Tuning** tool lets you select and tune up to three source colors at once and automatically gives you an available tuning range based on your selected color(s). This tool is best for heavily saturated colors; selecting a relatively white or gray color may only allow a very narrow adjustment range.

*Note: This tool appears similar to the **White Balance** tool but is not designed for changing white tones.*

To tune your image colors:

1. Click the **Color Tuning** tool in the **HDR Image Tools** panel to open the **Color Tuning** window.
2. Use the **Source Color** eyedropper to select the color in the image that you want to tune.
3. The **Gamut** control displays the range of available tuning options for the selected color. The more saturated the source color, the greater the range will be. Select the exact target color by left-clicking the desired color. You can zoom the color gamut in and out for fine adjustments by scrolling the mouse wheel. You may also move the gamut by right-clicking and dragging it.
4. If desired, add another point by clicking the **Add New** button (**+**) and repeating Steps 2 and 3 for the second and/or third point(s). If necessary, you may delete the most recently added point by clicking the **Remove Last** (**-**) button.

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Color Tuning (continued)

5. The **Brightness** slider lets you change the brightness level of the selected color range when color tuning your image.
6. Click **Apply** to tune the selected color(s).

Note: To preserve one or two specific color(s), add one or two points as described in Steps 1-2, above. Then, add another point as de-scribed in Step 4 and tune that point. This alters the tuned color while leaving the non-tuned colors unchanged.

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Dynamic Range Mapping

The **Dynamic Range Mapping** tool is a quick way to automatically map the image's dynamic range into the range of your monitor. To map the image range:

1. Click the eyedropper tool.
2. Click a midtone point in the image.

The **Dynamic Range Mapping** tool will then alter the image's contrast to map its dynamic range to the monitor's available range while setting the selected point at 18% brightness relative to the new contrast.

The midtone brightness level is presumed to be at 18% based on the monitor's maximum brightness, which is tied to the 0EV level on the **Brightness Histogram**. You should typically set the midtone point on the principal part of the image for optimal viewer perception. For best results, the image's brightness at the selected point should be at 18% relative to image's overall contrast (dynamic range).

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Presets

Most HDR Expose tools include presets. Presets are a great way to save and apply settings on a tool-by-tool basis.

Applying Presets

To apply a preset:

1. Select the tool for which you want to apply a preset. For example, to apply a white balance preset, select the **White Balance** tool.
2. Click the **Presets** icon at the bottom of the **HDR Image Tools** panel and then select your desired preset from the list of available options.

Creating Presets

To create a preset:

1. Open the tool and set it to your desired values.
2. Click the **Presets** icon and then select **Add preset** to open the **Add preset** window.
3. Enter a name for the new preset in the field and then click **OK**. The new preset is now available for use.

Working with Presets

The **Presets** tab of the **Preferences** window lets you import, export, and delete presets. Please see “Presets Tab” on page 29 for more information about working with presets.

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Recipes

Recipes store a series of editing actions for later use with other images. This is a powerful way to avoid redoing the same series of actions over and over when working on similar images. You may load recipes into your current HDR Expose session, use loaded recipes, and save and clear recipes.

Loading a Recipe

To load a recipe, use the **Recipe** tab of the **Preferences** window, as described in "Recipes Tab" on page 30.

Using a Recipe

To use a recipe:

1. Load the recipe as described above.
2. Use the **Recipe** pull-down menu to select the recipe you want to apply to the current image.

Clearing Loaded Recipes

To clear a recipe, use the **Recipe** tab of the **Preferences** window, as described in "Recipes Tab" on page 30.

Creating a Recipe

Recipes are created using the current image's editing history, which his viewable in the **History** section of the **HDR Image Tools** panel. Please see "History" on page 40 for more information about working with image history. If you're working with a BEF file, this history may include actions taken during previous editing sessions, which is viewable in the **Metadata** section of the **HDR Image Tools** panel. Please see "Metadata" on page 16 for more information about image metadata.

To create a recipe:

1. Click the **New Recipe** (**+**) button next to the pull-down menu.
2. The pull-down menu will display **New Recipe**. Enter a name for your new recipe and then press [ENTER].

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HDR Expose 1.0

User Manual

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